

Modulation effect of crude ginseng total saponins(CGS) in the asthmatic airway inflammation induced by ovalbumin(OVA) and cigarette smoke condensate(CSC)

¹Department of Industrial Plant Science & Technology, Chungbuk National University

²Department of Oriental Medicine, Daejeon University

Sung-Jin Hong¹, Ho-Geun Kwak¹, Seung-Hyeong Kim², Heung-Bin Lim¹

Objectives

Saponins exists in red ginseng have been reported to have effects such as antifatigue, drop of blood glucose level, hemolysis, improvement of immune function and anticancer. While, the inhalation of cigarette smoke have been suggested to make symptoms of respiratory diseases worse such as asthma, chronic bronchitis, bronchial pneumonia. The aim of present study was to investigate the effect of crude ginseng total saponins(CGS) in the asthmatic airway inflammation induced by ovalbumin(OVA) and cigarette smoke condensate(CSC) in mice.

Materials and Methods

o Intratracheal instillation of CSC & OVA, and treatment of CGS to mice.

After anesthetizing mice with 10% chloral hydrate, Mice were treated the 100 ul of 1 mg/ml of CSC suspension once a week for 10 weeks by intratracheal instillation and mice were also nebulized the 1 % OVA PBS buffer solution(pH 7.4) for 30 mins once a week for 10 weeks by Buxco Aersol Dilivery System. We administered to mice with the concentration of CGS 75 mg/kg orally 5 times a week for 10 weeks.

o OVA sensitization and the measurement of airway hyperresponsiveness

OVA sensitization and inhalation to mice was performed by the method of Harmond et al.(2004) and airway hyperresponsiveness was measured according the procedure of Finotto et al(2001) by using Biosystem XA equipped with whole body plethysmographs.

o Determination of cytokine and chemokine level

We measured the IL-4, IL-5, IL-13 and IFR- γ level in the bronchoalveolar lavage fluid (BALF) of mice, the histamine and IGE level in blood with using ELISA kit.

Results

Oral CGS treatment to mice decreased the serum immunoglobulin (IgE) and histamine level increased by CSC and OVA, and declined the respiratory resistance. It also dropped an enhanced infiltration of eosinophils in the BALF of mice, and an increased T helper type 2 cell derived cytokine levels such as of interleukin (IL)-4, IL-13 and IL-5 in the BALF

Corresponding author: Heung-Bin Lim, E-mail: Heungbin@chungbuk.ac.kr, Tel: 043-261-3288

However, it increased more the IFR- γ level, T helper type 1 cytokine, in the BALF. These results indicate that CGS may alleviate OVA+CSC allergen-related airway inflammation and airway hyperresponsiveness in mice and may play an important role in the modulation of asthmatic airway inflammation.

Test scores

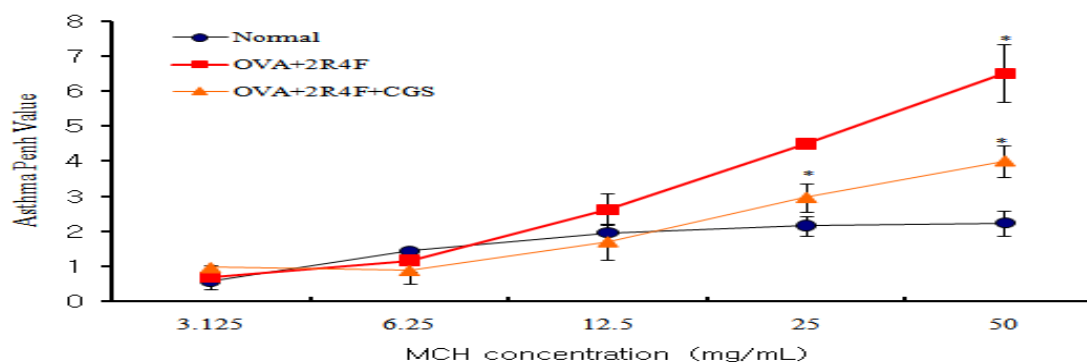


Fig. 1. Effect of CGS on airway hyperresponsiveness by MCH in OVA & CSC treated mice. * Significantly different from OVA+D_{EP} group(p<0.01)

Table 1. Change of lung weights, the number of total cells and eosinophils in bronchoalveolar lavage fluid

	Normal	OVA+CSC	OVA+CSC+CGS
lung weights(g)	0.24 ± 0.03	0.36 ± 0.06 [#]	0.29 ± 0.06
Total Cells(x 10 ⁵ cells)	1.81 ± 0.23	6.85 ± 0.95 [#]	3.53 ± 0.48 ^{#*}
Eosinophils(x 400)	4.00 ± 1.00	95.0 ± 8.00 [#]	53.5 ± 4.72 ^{#*}

[#]:Significantly different from normal group(p<0.01)

^{*}:Significantly different from OVA+D_{EP} group(p<0.01)

Table 2. Change of histamine and IgE levels in serum

	Normal	OVA+CSC	OVA+CSC+CGS
Histamine(uM)	9.1 ± 1.1	115.5 ± 10.8 [#]	56.6 ± 6.3 ^{#*}
IgE(x 10) (pg/ml)	145.1 ± 13.8	483.0 ± 75.4 [#]	164,9 ± 25.7 [*]

[#]:Significantly different from normal group(p<0.01)

^{*}:Significantly different from OVA+D_{EP} group(p<0.01)

Table 3. Change of cytokine levels in bronchoalveolar lavage fluid.

Cytokine	Normal	OVA+CSC	OVA+CSC+CGS
IL-4(pg/ml)	7.3 ± 1.8	72.8 ± 9.1 [#]	34.4 ± 7.1 ^{#*}
IL-5(pg/ml)	10.9 ± 3.1	250.9 ± 33.8 [#]	109.6 ± 9.5 ^{#*}
IL-13(pg/ml)	19.0 ± 2.4	228.7 ± 49.5 [#]	101.1 ± 13.2 ^{#*}
IFN-gamma(pg/ml)	30.2 ± 2.2	41.1 ± 7.2	83.0 ± 14.7 ^{#*}

[#]:Significantly different from normal group(p<0.01)

^{*}:Significantly different from OVA+D_{EP} group(p<0.01)